4.10 NOISE

The purpose of the noise section is to identify, describe, and evaluate Project-related noise sources, and to assess the potential effects of that noise on sensitive receptors, and to identify land use conflicts related to environmental noise. To determine the potential for significant noise impacts, the baseline noise conditions and surrounding existing sensitive land uses are characterized in this section.

Common noise sources associated with a fiber optic cable project include: offshore site preparation and cable-laying activities (e.g., cable laying vessels and project support vessels); construction activities (e.g., truck traffic and backhoes); increased motor vehicle traffic; and other onshore and offshore activities.

The construction operations that are necessary for the terrestrial portion of the Project relate to clearing operations for access routes and onshore laydown areas that are due to the need to pull cables through the existing conduit system. Due to the remoteness of a few of the manholes, it may be necessary to do some minor grading and/or maintenance on existing roads/trails. Offshore noise-producing activities are related to vessel movements, anchoring, and diver activities along and within the cable route.

The following discusses the existing noise levels within the onshore and offshore areas of the proposed Project. This section includes a listing of significance criteria, assesses potential noise-related impacts from the proposed actions, and discusses Project-incorporated mitigation measures that are designed to reduce or eliminate adverse impacts.

4.10.1 Environmental Setting

Onshore

Previous fiber optic cable EIRs suggest that there are no noise-sensitive receptors located in the vicinity of the onshore site except at Montaña de Oro State Park (SAIC 2000). Information on the onshore Project site maps (see Figures 2-5a through 2.5-d) suggests that the sensitive receptor that is closest to the Sandspit Beach parking lot is a private residence located approximately 0.5 mile (0.8 kilometer [km]), to the northeast near the entrance to the State Park on Pecho Valley Road; the ridge conduit route comes within 0.3 mile (0.5 km) of a residential development in Los Osos.

The Montaña de Oro State Park Sandspit Beach parking lot and the associated beach area is used for a variety of recreational activities including, but not limited to, surf

fishing, walking, jogging, bird watching and horseback riding. Ambient noise in this area consists of background vehicle noise associated with the Sandspit Beach parking lot, and noise created by waves and wind.

The primary area of concern within this segment of the Project is the landing site location at the Sandspit Beach parking lot where cable connections will be made. The parking lot is open for use from 8:00 a.m. to sunset and is located in the northern portion of the State Park. The nearest campgrounds within the Park are located 2 miles (3.2 km) to the south of the Sandspit Beach parking lot.

Offshore

Although no Project area-specific noise data are known, natural background noise is generally high due to the frequent strong winds and surf (SAIC 2000). Morro Bay supports a relatively active boating community and the nearshore waters are likely to be subjected to vessel-generated noise, particularly during the summer when conditions are conducive to boating activities.

4.10.2 Regulatory Setting

Onshore

Noise is regulated at the Federal, State and local levels through regulations, policies and/or ordinances. Local policies are commonly adaptations of Federal and State guidelines, based on prevailing local conditions or special requirements. The County of San Luis Obispo Noise Element, revised in 1992, sets forth the quantitative standards applicable to the proposed Project. The County's Noise Element establishes maximum allowable noise exposure levels for stationary sources such as construction activities. The guideline levels are a function of the sensitive receptor land use, and indoor and outdoor receptors.

Exceptions to noise standards are provided in Land Use Ordinance 22.06.042. They include, among others, noise restrictions for construction activities between the hours of 7:00 a.m. and 9:00 p.m. on weekdays and 8:00 a.m. and 5:00 p.m. on weekends; traffic-generated noise levels on public roadways; and the limitations on the use of any mechanical equipment related to emergency activities.

Offshore

Marine Mammal Protection Act

The Marine Mammal Protection Act (MMPA) is a national policy designed to protect and conserve marine mammals and their habitats. Under the MMPA, the Secretary of Commerce is responsible for the conservation and management of pinnipeds (other than walruses) and cetaceans. This act also specifies and defines actions that are considered harassment and provides for agency-mandated compliance with mitigations to reduce impacts to the protected species. Sections 101 (a) (5) (A) and (D) of the MMPA, 16 USC 1361 et seq., as amended, establish criteria for incidental harassment of marine mammals based on noise levels.

Marine mammal in-water noise-associated harassment is defined by the National Oceanic and Atmospheric Administration (NOAA) as any noise above 160 decibels in reference to one micro Pascal root mean square (dB re 1 µPa rms) (DeAngelis, personal communication, 2008). In-air noise-associated harassment is defined by NOAA as any noise above 90 Decibels on the A-weighted Scale (dBA) (DeAngelis personal communication, 2008). As cited in Cornell University Law School (2008), Level A harassment is “any act of pursuit, torment, or annoyance which has potential to injure a marine mammal or a marine mammal stock in the wild”. Level B harassment is defined as any act that “has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering”.

Marine mammals have shown behavioral changes when exposed to impulse pressure levels of 160 dB re 1 µPa rms; however, injury is not observed at this level. Onset of injury to marine mammals may occur at the impulse sound pressure level of 180 dB re 1 µPa rms, and at 190 dB re 1 µPa rms for pinnipeds (NOAA 2006).

The effects of underwater noise on sea turtles are not well studied; however, NOAA Fisheries also considers the 190 dB re 1 µPa rms level to be detrimental to sea turtles (Fahy, personal communication 2008).

Most of the studies on the effects of noise on fish have focused on impulse (i.e. pile driver) noise as opposed to the continuous noise produced by vessels. Table 4.10-1 summarizes the general criteria used by NOAA Fisheries to access the onset of injury or behavioral effects on fish as a result of noise impacts (Woodbury, personal

communication 2008); however, no formal criteria have been set for noise exposure on fish.

Part of the responsibility that NOAA Fisheries has under the MMPA involves monitoring populations of marine mammals to assure that they stay at optimum levels. If a population falls below its optimum level, it is designated as "depleted," and a conservation plan is developed to guide research and management actions to restore the population to healthy levels.

Table 4.10-1. Summary of the Onset of Behavioral Changes and Injury to Fish when Exposed to Impulse Pressure Levels

Effect	Metric	Fish Mass	Threshold
Onset of physical injury	Peak pressure	N/A	206 dB (re 1 µPa)
	Accumulated Sound Exposure Level (SEL)	≥ 2 g	187 dB (re 1 μPa^2•sec)
		< 2 g	183 dB (re 1 μPa^2•sec)
Adverse behavioral effects	Root Mean Square Pressure (rms)	N/A	150 dB (re 1 µPa)

4.10.3 Significance Criteria

A significant noise impact would be one that would:

1. Result in underwater or in-air noise levels that are equal to or exceed NOAA Fisheries guidelines for Level A or B harassment of marine mammals (*i.e.* peak in-water levels generally at or above 160 dB re: 1 µPa rms, or in-air levels generally at or above 90 dBA) and/or in-water noise levels that exceed 190 dB re 1µPa rms for sea turtles; or

2. Result in noise levels that would exceed an hourly average (L_{eq}) of 50 dBA during the daytime (7:00 a.m. to 10:00 p.m.) and 45 dBA at night (10:00 p.m. to 7:00 a.m.) at residential property lines, or result in maximum instantaneous noise levels that exceed 70 dBA during the daytime and 65 dBA at night.

4.10.4 Impact Analysis and Mitigation

The following discussion presents the anticipated noise impacts from the proposed Project and alternatives. Mitigation measures have been included to reduce noise impacts to less than significant levels.

Impact Discussion

Construction Related Impacts Less than Significant

Onshore. At the Sandspit Beach Parking Lot, noise-generating activities would occur during the conduit access and cleaning, and cable pulling operations. Assuming typical diesel engines would be operating at these times, they could produce levels approaching 95 decibels at a distance of 10 feet (ft) (3 meters [m]). Noise levels decrease six decibels with each doubling of the distance from the noise source. This means that noise levels would be below the applicable significance criteria at a distance of approximately 200 ft (61 m), and no residences or campsites would, therefore, be adversely impacted. Given coordination of all activities with State Parks personnel as described in Section 4.8, Land Use and Recreation, and the short-term nature of the shore-end construction activity, the noise impact would be less than significant (Class III).

Offshore. The nearshore cable laying activities for the proposed Project and related noise generation would be similar to that discussed in a previously completed fiber optics cable Draft EIR at the same site (SAIC 2000). Based on the previous study, the noise impact from the proposed Project in the nearshore area is expected to be intermittent over a period of up to two months, with vessels operating at varying distances from shore, but never closer than 0.5 mile (0.8 km).

Medium-sized support and supply vessels generate noise within frequencies between 20 Hertz (Hz) and 10 kilohertz (kHz) with source levels between 130 and 160 dB re 1 µPa at 1 m (Richardson, et al. 1995). Tech Environmental (2008) presents a summary of noise levels generated by a 984 foot- (300 m) long, dynamically-positioned vessel (191 dB re 1 µPa at 1 m) and support vessels (170 to 190 dB re 1 µPa at 1 m) during pipe laying operations associated with the construction of the BP Claire LNG development off the Shetland Islands, North Atlantic.

Noise studies for construction-related vessels used for the Northeast Gateway (NEG) LNG project off the east coast of the United States (U.S.) found that “sound generated by these vessels is proportionate to ship size, speed, engine load and revolutions per minute (rpm) with broadband source levels driven primarily by propeller cavitations, hydrodynamic flow over the hull and hull appendages, and machinery onboard” (Tech Environmental 2006). An acoustic screening analysis was completed for construction of the lateral pipeline for the NEG project. The model assumed construction vessels operating simultaneously would produce noise levels ranging from 150 to 170 dB re

1 1 μPa at 1 m during vessel movements to 180 dB re 1 μPa at 1 m when thrusters are
2 being used for dynamic positioning. Thrusters are operated intermittently and only for
3 relatively short durations but are considered the dominant sound source during
4 construction activities.

5 Table 4.10-2 provides Tech Environmental's estimated or recorded noise levels by
6 distance for those vessels.

7 **Table 4.10-2. Summary of NEG Project Construction and Operational**
8 **Underwater Sound Source Levels and Distance to Threshold**

Sound Source	Sound Source Level (dBL re 1 µPa at 1 meter)	Distance in Meters to Received Sound Level Contour dB re 1 µPa				
		120	160	170	180	190
Construction						
12,000 hp anchor handling vessel (AHV)	150-170					
10,000 hp diving support vessel (DSV)						
4,800 hp restoration vessel						
1,200 hp crew boat						
use of thrusters for dynamic positioning	+ 5 to 10 dB	3,700 to 3,800	<25	<15	<3	-

9 Source: Tech Environmental 2006.
10
11 The proposed cable lay vessel is approximately one-third the length of that vessel and
12 will traverse the site at a maximum of 2 knots (3.7 km/hour) during cable lay operations.
13 While "standing off" the conduit site, the primary noise sources will be the position-
14 maintaining thrusters.

15 Many marine animals are vulnerable to impacts from incidental vessel noise because
16 they produce and perceive low-frequency sounds. Mysticetes (baleen whales) are most
17 sensitive to low frequency sounds (2 Hz to 60 kHz). Odontocetes (Dall's porpoise, Killer
18 whales and dolphins) vocalize at higher frequencies (40 Hz to 500 kHz), although some
19 species may vocalize and hear lower frequency sounds. Pinnipeds (seals, sea lions
20 and walrus) have been shown to be sensitive to a wide range of frequencies because of
21 adaptations to living on land and in water (Southhall 2004; NOAA 2006).

22 Fish can be separated into two categories: hearing generalist and hearing specialists,
23 with hearing generalists having relatively poor hearing sensitivity within a narrow range
24 of low frequencies (0.1 to 1 kHz). Hearing specialists have a greater range of low

frequencies (0.1 to 3 kHz) (Hastings and Popper 2005). Noise has also been shown to damage eggs and larvae, reduce reproduction rates, and cause physiological or morphological damage to fish and invertebrates (Hastings and Popper 2005; NOAA 2006). Figure 4.10-1 provides a graphic of the frequencies detected by various receptors and generated by ocean-going vessels. Table 4.10-2 provides information on the range of hearing frequencies for some marine mammals and reptiles.

Because most of the frequency of the acoustic energy radiated from large commercial vessels is below one kHz, the greatest potential for that noise to mask the hearing of marine organisms would be for groups of marine animals that produce and receive sounds in this range of frequencies including mysticetes, pinnipeds (particularly the phocids), and fish. The potential for masking at higher frequencies (1 to 25 kHz) exists when the vessel is in close proximity to the animal. In these close proximity circumstances other marine mammals, including many toothed cetaceans (beaked whales, sperm whales, dolphins and porpoises) may also experience masking from vessel noise.

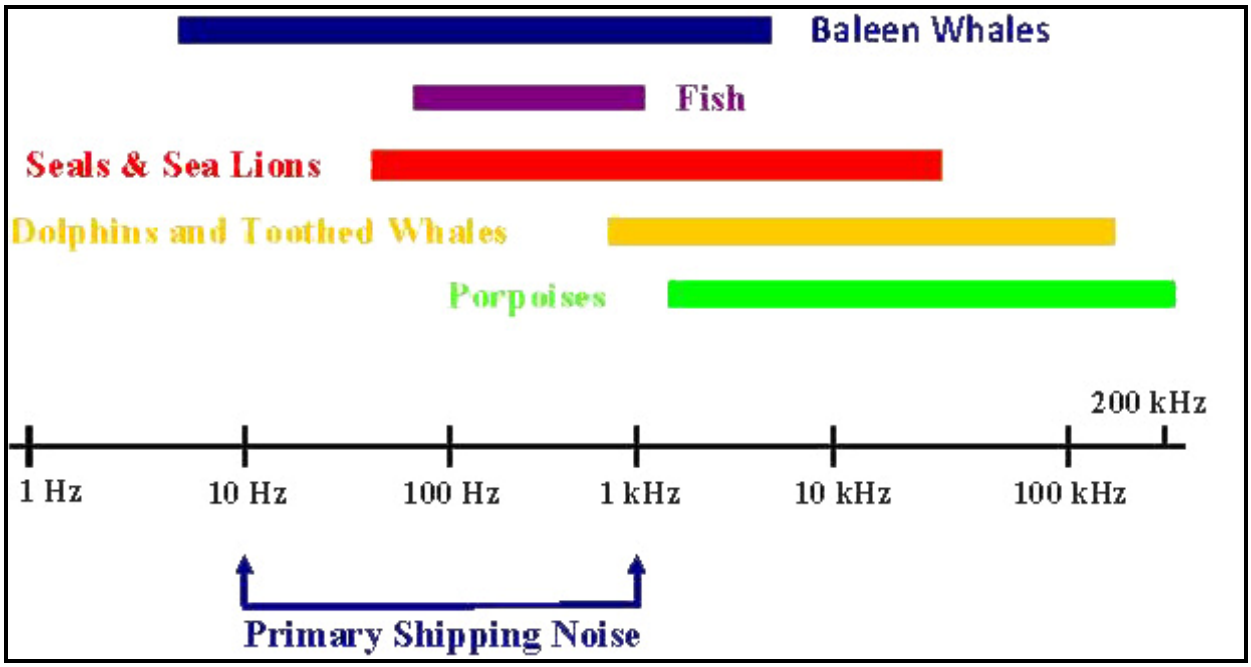
Broadband underwater source levels for small, supply boat-sized ships (180 to 280 ft [55 to 85 m]) range from 170 to 180 dB re 1 μPa. Most of the sound energy produced by these vessels, including many of the commercial fishing vessels operating off southern California, is at frequencies below 500 Hz (MMS 2001b, cited in Entrix 2004). Vessels used to support operations at an offshore drill rig were recorded at average noise levels of approximately 182 dB re 1 μPa, the noise produced mainly by the bow thrusters (Pidcock et al., 2003, cited in Entrix 2004).

Potentially Significant Impacts

Impact NOI-1: Exceed NOAA-Specified Noise Levels for Marine Mammal Harassment During Cable Laying Operations

While vessel-specific noise measurements are not available, it is expected that maximum noise levels will be at or near the NOAA-specified harassment levels only within a short distance of the vessel (Potentially Significant, Class II).

Although the potential for noise-related impacts to marine mammals are possible, the area of potential effect is expected to be 1,000 ft (310 m) or less around the vessel, and would be limited to the cable lay and burial operations (Class II). Removal of the proposed cable at the time of retirement is anticipated to result in similar impacts as installation.



Source: Adapted from Okeanos 2008

Figure 4.10-1. Frequency Relationships between Marine Animal Sounds and Shipping Noise

Mitigation Measure for NOI-1: Potential Harassment of Marine Mammals

MM-NOI-1. **Marine Wildlife Contingency Plan.** A marine wildlife contingency plan for the cable lay and post-lay surveys shall be prepared that will include measures to reduce the chance of noise-related impacts to marine mammals within the area most likely to support the most common cetaceans. That plan shall include the provision for NOAA Fisheries-approved marine mammal monitors to be onboard the cable lay, cable burial and support vessels for complete daytime observations during marine construction activities within 50 miles (80 km) of the shore.

Rationale for Mitigation

The measure presented in this section provides improved protection from noise exposure to marine mammals offshore. This measure will help to minimize the effect of Project-generated noise on marine mammals, resulting in a reduced impact to offshore marine mammals.

Table 4.10-2. Frequency Ranges for Selected Species

(Adapted from: California State Lands Commission 2006)

Taxa	Common Name	Genus/Species	Frequency Range
Mysticetes	Blue whale	*Balaenoptera musculus*	12 Hz to 31 kHz
	California gray whale	*Eschrichtius robustus*	2 Hz to 20 kHz
	Fin whale	*Balaenoptera physalus*	14 Hz to 28 kHz
	Humpback whale	*Megaptera novaeangliae*	10 Hz to 20 kHz
	Minke whale	*Balaenoptera acutorostrata*	20 Hz to 60 kHz
Odontocetes	Bottlenose dolphin	*Tursiops truncates*	40 Hz to 150 kHz
	Dall's porpoise	*Phocoenoides dalli*	40 Hz to 149 kHz
	Killer whale	*Orcinus orca*	120 Hz to 500 kHz
	Long-beaked common dolphin	*Delphinus capensis*	67 Hz to 500 kHz
	Northern right whale dolphin	*Lissodelphis borealis*	1 kHz to 40 kHz
	Pacific white-sided dolphin	*Lagenoryhnchus obliquidens*	2 kHz to 80 kHz
	Risso's dolphin	*Grampus griseus*	80 Hz to 100 kHz
	Short-beaked common dolphin	*Delphinus delphis*	67 Hz to 500 kHz
	Short-finned pilot whale	*Globicephala macrorhynchus*	20 Hz to 500 kHz
	Sperm whale	*Physeter macrocephalus*	30 Hz to 100 kHz
Pinnipeds	California sea lion	*Zalophus californianus*	60 Hz to 100 kHz
	Northern elephant seal	*Mirounga angustirostris*	2.5 Hz to 200 kHz
	Northern fur seal	*Callorhinus ursinus*	4 kHz to 28 kHz
	Pacific harbor seal	*Phoca vitulina richardsi*	100 Hz to 180 kHz
Fissipedia	Southern sea otter	*Enhydra lutris nereis*	3 kHz to 5 kHz
Cryptodira	Sea turtles	N/A	60 Hz to 800 Hz
	Loggerhead sea turtle	*Caretta caretta*	250 Hz to 1000 Hz

Note: The most extreme ranges known at low and high frequencies are noted. Most of the frequency ranges listed above represents the range of frequencies in which these species vocalize. In a few cases, frequency response ranges are known and are presented.

Table 4.10-3. Summary of Noise Impacts and Mitigation Measures

Impact	Mitigation Measures
NOI-1: Exceed NOAA-Specified Noise Levels for Marine Mammal Harassment During Cable Laying Operations	**NOI-1:** Marine Wildlife Contingency Plan

4.10.5 Impacts of Alternatives

The CEQA Guidelines emphasize that a selection of reasonable alternatives and an adequate assessment of these alternatives be presented to allow for a comparative analysis for consideration by decision-makers. Two alternatives are discussed for this EIR: (1) No Project Alternative, and (2) Cable Re-route/Maximum Burial Alternative.

No Project Alternative

This alternative would not include or require any new construction activities to take place at Montaña de Oro State Park, along the ridge conduit system, or within the offshore waters. Since no action is proposed, no changes to the existing noise environment would occur. Therefore, this alternative would result in no noise-associated impacts to sensitive receptors within the Project area. The No Project Alternative would not result in any noise-related impacts within the site or region.

Cable Re-route/Maximum Burial Alternative

The Maximum Burial Alternative would utilize the same construction procedures as described previously for the proposed Project. However, due to the increase in construction time for the longer cable, the duration of the impacts would increase. These impacts are mitigated by the same measures that have been described above in Section 4.10.4, Impact Analysis and Mitigation, with respect to the proposed Project. The impacts are expected to be short-term but potentially significant (Class II).

4.10.6 Cumulative Projects Impact Analysis

Due to the nature of the proposed Project, impacts associated with noise are temporary and are a result of construction activities. Following construction activities, ambient noise levels within the Project area are expected to return to pre-Project levels. Therefore, due to the nature of Project impacts, only those projects in the immediate vicinity and those that would increase ambient noise levels during the four to six weeks of Project construction would be considered a cumulative impact.

None of the cumulative projects are expected to have marine construction activities that will coincide with those of the proposed Project; therefore, no cumulative impacts on noise are anticipated.